

A Course in Computers

15/5/2018 Week 1:

Have all networking components: switch, cables computers in a box. Draw a diagram of an Ethernet topology: a switch with cables radiating out from it and computers at the end of each cable. Explain the topology of Ethernet and how information travels up and down the cables, between the computers via the switch. Pull each component out of the box as you explain, so the children know what each looks like. At the end, have the children assemble the network themselves.

Explain the difference between superusers and normal users. Introduce the `adduser` command. Get the children to log in as superuser and create themselves an account with the `adduser` command.

Explain how programs are distributed as set of files called packages. Introduce the `apt-get` command, used to install programs. Get them to install a program, with a command such as `apt-get install talkd ytalk`. Get the children to run the chat program.

Explain how a LAN works, based on the Ethernet just assembled. Explain how each computer has a unique number assigned to it, called the MAC address. In this way the network knows where to send information. Information is sent as packets. A packet is just a message that takes a short amount of time to send and contains the addresses of where it is going to and where it has come from. This network is very fast, able to send 1 billion bits per second (1Gbps).

What does the word Internet mean? The answer is INTERNETworking. It is a way to connect networks, like the one we have just built into a larger network, large enough to cover the world. Computers on the Internet use the Internet Protocol to talk to each other. Ask the question how do the computers know where to send information over the network? The Internet Protocol uses Internet Addresses, which are just unique numbers, to identify each computer. You can manually assign an address to each computer, but that is a lot of work, so the addresses on our network are given to each computer by the server (using DHCP, the Dynamic Host Configuration Protocol). The Internet is divided into layers. The lowest layer is the physical layer, meaning the cables and other hardware connecting the computers together. The second layer is Ethernet, the local area network. The third layer is the Internet Protocol, which connects the Local Area Networks together.